## REMARKS

Applicants respectfully request that the above-identified application be reexamined.

Claims 1-31 are pending in this application. The Office Action mailed September 7, 2007 (hereinafter "Office Action"), rejected Claims 1-14 and 16-23 under 35 U.S.C. § 102(e) as being unpatentable over U.S. Patent No. 6,578,046, issued to Chang et al. (hereinafter "Chang et al."). Claims 15 and 24-31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chang et al. in view of U.S. Patent No. 6,792,431, issued to Tamboli et al. (hereinafter "Tamboli et al.").

Pursuant to 37 C.F.R. § 1.111 and for the reasons set forth below, applicants respectfully request reconsideration and allowance of the pending claims. Prior to discussing in detail why applicants believe that all the claims in this application are allowable, a brief description of the disclosed subject matter and brief descriptions of the teachings of the cited and applied references are provided. The following descriptions of the disclosed subject matter and the cited and applied references are not provided to define the scope or interpretation of any of the claims of this application. Instead, these descriptions are provided solely to assist the United States Patent and Trademark Office in recognizing the differences between the pending claims and the cited references, and should not be construed as limiting on the disclosed subject matter.

Disclosed Subject Matter

A plurality of data stores, each of a different type, that store one or more data objects are disclosed. An object-oriented heterogeneous data store interface for interacting with the data stores is also disclosed. The object-oriented heterogeneous data store interface includes a query component and a provider interface that specifies a query behavior with a query component parameter for provider components. For each type of data store, there is a provider plug-in to the object-oriented heterogeneous data store interface. Each provider plug-in includes one or more provider components that conform to the provider interface.



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The query component of the object-oriented heterogeneous data store interface is instantiated. Each query component has an add expression behavior with at least one query term parameter and a query operator parameter. A query expression is added to the instantiated query component with the add expression behavior of the query component. The query component is provided to a data store component of the object-oriented heterogeneous data store interface.

The object-oriented heterogeneous data store interface includes one or more data store object components corresponding to data objects stored in the data stores. A data store object design graphical user interface (GUI) is utilized to build graphical representations of data objects. A data store object source code generator generates object-oriented programming language source code for each data store object component of the object-oriented heterogeneous data store interface.

Summary of Chang et al. (U.S. Patent No. 6,578,046)

A computer method and system capable of searching multiple heterogeneous data stores with heterogeneous data types by employing an object oriented data model to define a federated data store object. The federated query object translates a generic query into the appropriate queries for each data store, the federated data store object acts as a virtual data store for multiple heterogeneous data stores with the ability to map concepts between data stores, and the federated collection object represents results from a federated query in a hierarchy that maintains sub-grouping information from each data store to allow accessing of results by data store or as a single collection of results. The federated objects thus provide user applications with enhanced accessibility of different hierarchies of information, as well as more robust search capabilities.

While disclosing a method of searching heterogeneous data stores using a federated data store object, Chang et al. fails to teach object-oriented heterogeneous data store interface utilized to provide data store objects to applications in a form native to the object-oriented programming language of the application.



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Summary of Tamboli et al. (U.S. Patent No. 6,792,431)

Tamboli et al. purportedly discloses data integration including extracting a first native record with a first native format from a first native repository through a first adapter. The first adapter is loosely coupled for data integration to a data integration application. The first native format has a particular data type which transforms the first native record with the first native format to a first native record with a dynamic common format. The dynamic common format is a subset of a dynamic common model. The dynamic common model comprises mappings to and from the dynamic common format for all native records in all data types, transforming the format of the first native record with a dynamic common format to a first native record with a second native format, and inserting, through a second adapter, also loosely coupled to the data integration application, the first native record with the second native format into a second native repository.

Rejection of Claims 1-14 and 16-23 Under 35 U.S.C. § 102(e)

As indicated above, Claims 1-14 and 16-23 were rejected under 35 U.S.C. § 102(e) as being unpatentable over Chang et al.

Claims 1-12

Remarks accompanying the rejection of independent Claim 1 in the Office Action state:

> **As per claim 1**, Chang teaches "at least one data store, each data store comprising a different data store type configured to store at least one data store object;" (Figure 3, Figure 6, column 8 lines 62-67, column 10 lines 13-21, wherein different datastores comprise different properties and objects stored)
>
> "an object-oriented heterogeneous data store interface comprising: a data store component corresponding to each data store;" (column 9 lines 40-44, column 10 lines 27-58, wherein datastore objects are represented).
>
> "a query component comprising a query specification attribute;" (column 9 lines45-53, column 12 line 36-67, "query evaluator")
>
> "and a provider interface comprising a query component behavior specification specifying a query behavior with said query specification attribute of said query component;" (column 17 line 47 – column 18 line 34, "query manager", "query base")



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"and for each data store, a provider plug-in to the object-oriented heterogeneous data store interface, and each provider plug-in comprises at least one provider component configured with a behavior conforming to the query component behavior specification of the provider interface." (column 9 lines 40-44, column 18 lines 37-43, column 38 line 66 - column 39 lines 35, column 38 lines 42-52, wherein each datastore preserves its own mapping and queries are accepted from specific databases)

As amended, Claim 1 reads as follows:

1. A computerized system, comprising:

a plurality of data stores, each data store comprising a different data type configured to store at least one data store object;

an object-oriented heterogeneous data store interface comprising:

**a data store component corresponding to each data store;**

**an identity service component including a directory of each data store component;**

**an enterprise component corresponding to the data store component, the enterprise component referencing the data store component by utilizing the directory included in the identity service component;**

a query component comprising a query specification attribute; and

a provider interface comprising a query component behavior specification specifying a query behavior with said query specification attribute of said query component; and

for each data store, a provider plug-in to the object-oriented heterogeneous data store interface, each provider plug-in comprising at least one provider component configured with a behavior conforming to the query component behavior specification of the provider interface. (Emphasis added.)

Applicants respectfully submit that Claim 1, as amended, is not anticipated by Chang et al. Specifically, applicants respectfully disagree with the Office Action that Chang et al. discloses the "object-oriented heterogeneous data store interface" clause of Claim 1. Col. 9, lines 40-44, and Col. 10, lines 27-58, of Chang et al., referenced by the Office Action with respect to this clause, describe a user having to create a specific data store object in order to have access to query processing functions provided by that data store. As a result of this process, the user creates a queryable collection, which serves to evaluate and process subsequent queries. (See Chang et al., Col. 9, lines 45-65.) However, the heterogeneous data store interface of Claim 1 is not created as



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a result of the process described in Chang et al., nor is it implied by the disclosed process. Rather, the heterogeneous data store interface is utilized by the computer system recited in Claim 1 and is an integral part of that system.

Furthermore, Chang et al. fails to teach, disclose, or remotely suggest the elements of the heterogeneous data store interface, in particular the ones added to Claim 1 by this amendment in order to better distinguish the "heterogeneous data store interface" recitations of Claim 1 from Chang et al. The added elements include an identity service component including a directory of each data store component, and an enterprise component corresponding to the data store component, the enterprise component referencing the data store component by utilizing the directory included in the identity service component, neither of which are disclosed or suggested by Chang et al.

Applicants respectfully disagree with the Office Action that Chang et al. discloses "a provider plug-in to the object-oriented heterogeneous data store interface." Col. 9, lines 40-44; Col. 18, lines 37-43; Col. 38, line 66 – Col. 39, line 35; and Col. 38, lines 42-52, referenced in the Office Action, describe a virtual "federated" data store that combines several heterogeneous data stores into a unified view or schema, with which users interact when access a virtual "federated" store. The federated data store coordinates query evaluation, data access, and transaction processing of the participating data stores. However, as Chang et al. points out, "the federated data store does not have a corresponding back-end client." (Col. 39, lines 1-2.) Further, the structure of the federated data store does not involve or imply the existence of a heterogeneous data store interface as recited in Claim 1. The "federated data store" organization is different in principle than one of the "computerized system" recited in Claim 1. Because of the differences, the federated data store structure does not contain any "plug-ins" needed for interaction between the provider interface and the data store interface, as recited in Claim 1.

In contrast to Chang et al., a plug-in for each data store is provided to, and "plugged into," the heterogeneous data store interface (see FIGURE 2 of the present application) in order to conform with a specific provider interface query component.

For the reasons described above, applicants submit that Claim 1 is not anticipated by Chang et al., and is thus allowable. Claims 2-12, which depend directly or indirectly from



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Claim 1, are also submitted to be allowable for at least the reasons why Claim 1 is submitted to be allowable.

Claims 13-14 and 16-22

Remarks accompanying the rejection of independent Claim 13 in the Office Action state:

> **As per Claim 13**, Chang teaches "A computer-readable storage medium having stored thereon computer-executable instructions for performing a method for a query component to specify a particular subset of a data store component" (see Abstract) "comprising:
>
> instantiating a first query component in a plurality of query components of an object-oriented heterogeneous data store interface, each query component of the object-oriented heterogeneous data store interface having an add expression behavior," (column 9 lines 40-53, column 12 line 36-67, wherein a query evaluator processes queries)
>
> "the add expression behavior having: at least one query term parameter;" (column 12 line 57-64, column 18 lines 12-55, wherein a query is created)
>
> "and a query operator parameter;" (column 17 lines 47-60, column 18 lines 12-18)
>
> "adding a query expression to the first query component with the add expression behavior of the first query component;" (column 12 line 57 -column 13 line 24, wherein elements are added to the query)"
>
> "and providing the first query component to a data store component of the object-oriented heterogeneous data store interface." (column 18 lines 37-44 wherein the query is for one specific datastore).

As amended, Claim 13 reads as follows:

> A computer-readable storage medium having stored thereon computer-executable instructions for performing a method for a query component to specify a particular subset of a data store component comprising:
>
> instantiating a first query component in a plurality of query components of an object-oriented heterogeneous data store interface, **the object-oriented heterogeneous data store interface comprising: a data store component corresponding to each data store; an identity service component including a directory of each data store component; an enterprise component corresponding to the data store component, the enterprise component referencing the data store component by utilizing the directory included in the identity service component; a query component comprising a query specification attribute; and a provider interface comprising a query component behavior specification specifying a query behavior with said query specification attribute of said query component**; each query component of the object-oriented heterogeneous data store interface having an add expression behavior, the add expression behavior having:
>
> at least one query term parameter; and



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a query operator parameter;

adding a query expression to the first query component with the add expression behavior of the first query component; and

providing the first query component to a data store component of the object-oriented heterogeneous data store interface. (Emphasis added.)

Applicants respectfully submit that Claim 13, as amended, is not anticipated by Chang et al. Specifically, applicants respectfully disagree with the Office Action that Chang et al. discloses the recitation of Claim 13 "instantiating a first query component in a plurality of query components of an object-oriented heterogeneous data store interface" as amended. The paragraphs in Chang et al. referenced by the Office Action disclose the query submission by creating a data store object and processing them by a query evaluator. However, the described process does not involve, or indeed imply, an object-oriented heterogeneous data store interface recited in Claim 13. In order to further distinguish Claim 13 from Chang et al., applicants have amended Claim 13 to include the elements comprising the heterogeneous data store interface.

Because Chang et al. fails to disclose the heterogeneous data store interface and the elements comprising it (see discussion of Claim 1 above), applicants submit that Claim 13, as amended, is not anticipated by Chang et al., and is thus allowable. Claims 14 and 16-22, which depend directly or indirectly from Claim 13, are also submitted to be allowable for at least the reasons why Claim 13 is submitted to be allowable.

Claim 23

Remarks accompanying the rejection of independent Claim 23 in the Office Action state:

As per claim 23, Chang teaches "a computerized system" (see Abstract), "comprising:

at least one data store, each data store comprising a different data store type, each data store capable of storing at least one data store object;" (Figure 3, Figure 6, column 8 lines 62-67, column 10 lines 13-21, wherein different datastores comprise different properties and objects stored)

"an object-oriented heterogeneous data store interface comprising at least one data store object component corresponding to at least one of said at least one data store object stored in said at least one data store;" column 9 lines 40-44, column 10 lines 27-58, wherein datastore objects are represented).

"a data store object design graphical user interface configured to enable building of a graphical representation of each data store object corresponding to at least one data store object component of the object-oriented heterogeneous data



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store interface;" (Figure 10 reference 45, column 41 line 65 – column 42 line 4, column 44 lines 50-63, wherein a representation of the mapping is presented)

"and a data store object source code generator capable of generating object-oriented programming language source code for each data store object component of the object-oriented heterogeneous data store interface." (column 20 line 58 – column 21 line 13, wherein a federated query is associated with the individual datastores).

As amended, Claim 23 reads as follows:

A computerized system, comprising:

a plurality of data stores, each data store comprising a different data store type, each data store capable of storing at least one data store object;

an object-oriented heterogeneous data store interface comprising:

at least one data store object component corresponding to at least one of said at least one data store object stored in said at least one data store;

**an identity service component including a directory of each data store component;**

**an enterprise component corresponding to the data store component, the enterprise component referencing the data store component by utilizing the directory included in the identity service component;**

**a query component comprising a query specification attribute; and**

**a provider interface comprising a query component behavior specification specifying a query behavior with said query specification attribute of said query component;**

a data store object design graphical user interface configured to enable building of a graphical representation of each data store object corresponding to at least one data store object component of the object-oriented heterogeneous data store interface; and

a data store object source code generator capable of generating object-oriented programming language source code for each data store object component of the object-oriented heterogeneous data store interface. (Emphasis added.)

Applicants respectfully disagree with the Office Action that Chang et al. teaches the "object-oriented heterogeneous data store interface" recitation of Claim 23, as amended. Applicants refer to the rationale provided in the above discussion of Claims 1 and 13 with respect to this clause. As a result, applicants respectfully submit that Claim 23 is not anticipated by Chang et al. and thus is also allowable.

Rejection of Claims 15 and 24-31 Under 35 U.S.C. § 103(a)

As indicated above, Claims 15 and 24-31 were rejected under 35 U.S.C. § 103(a) as being unpatentable over Chang et al. in view of Tamboli et al.



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Claim 15 depends from Claim 13 and Claims 24-31 depend directly or indirectly from Claim 23. Because Claims 13 and 23, as amended, are submitted to be allowable over Chang et al., Claims 15 and 24-31 are also allowable for at least the same reasons that Claims 13 and 23 are allowable. In this regard, Tamboli et al. does not disclose or suggest the differences of Chang et al. discussed above. Further, applicants submit that Chang et al. fails to disclose the "provider plug-in" recitation of Claims 29 and 30. Applicants refer to the rationale provided in the discussion of Claim 1 in regard to this recitation.

## CONCLUSION

In view of the foregoing amendments and remarks, applicants respectfully submit that the pending claims in the present application are allowable. Early and favorable action allowing these claims and passing this application to issue is respectfully solicited. If the Examiner has any questions, the Examiner is invited to contact applicants' attorney at the number set forth below.

Respectfully submitted,

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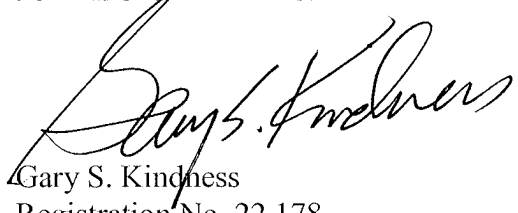

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